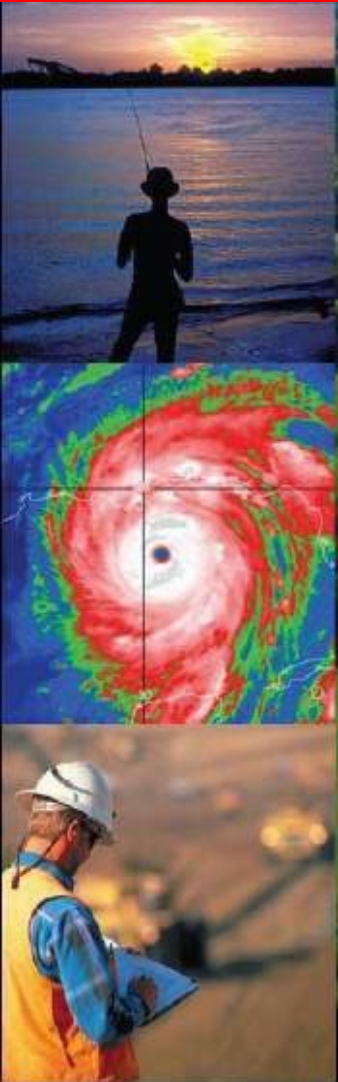




Systems Based Approaches to Hurricane Storm Surge Modeling

Virginia Brisley

21 May 2008



One Team: Communicating, Collaborating, Consensus



Coastal Storm Surge Modeling: Overview



- Joint Coastal Surge Analysis
 - Resources
 - Methodology
 - Output
- Systems Based Approach
 - Planning and scheduling
 - Interagency collaboration
 - Consistent methodology
 - Cumulative impact assessment
- Lessons Learned and Key Points



Resources: Collaborating Organizations



- USACE-MVN
- USACE-SWG
- ERDC
- FEMA Region 6
- NOAA
- U of Notre Dame
- U of Oklahoma
- U of Texas
- ARCADIS
- Taylor Engineering
- Ayres Associates
- OceanWeather
- Applied Risk Associates
- Royal Haskoning

**>65 personnel active
on project.
>100 total involved.**



Resources: High Performance Computing



Clock hours per storm:

Cray XT3

ERDC Sapphire

7.8 hours

Sun Constellation

UT Ranger

40 minutes

Dell Linux Cluster

UT Lonestar

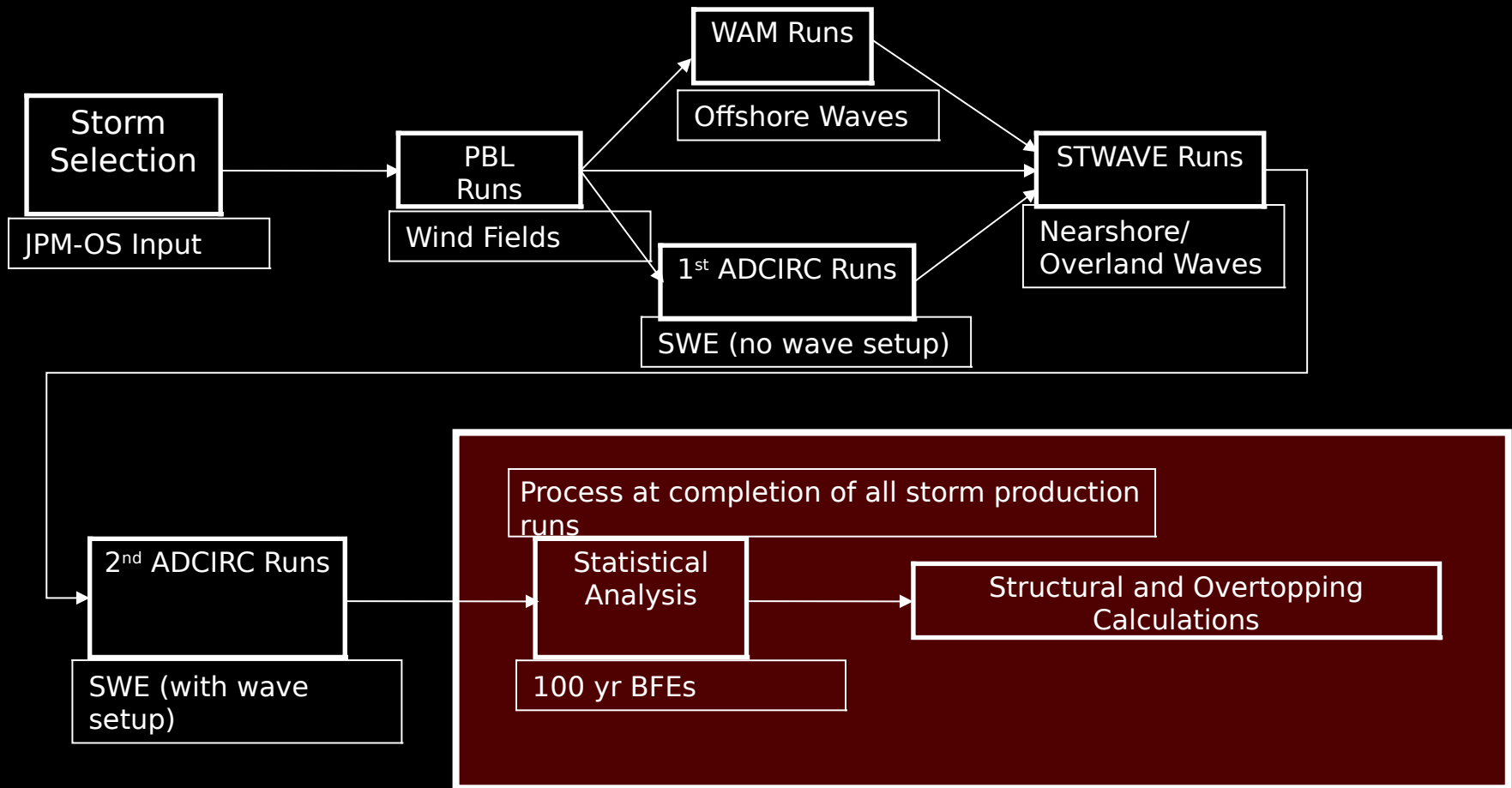
8 hours



One Team: Communicating, Collaborating, Consensus

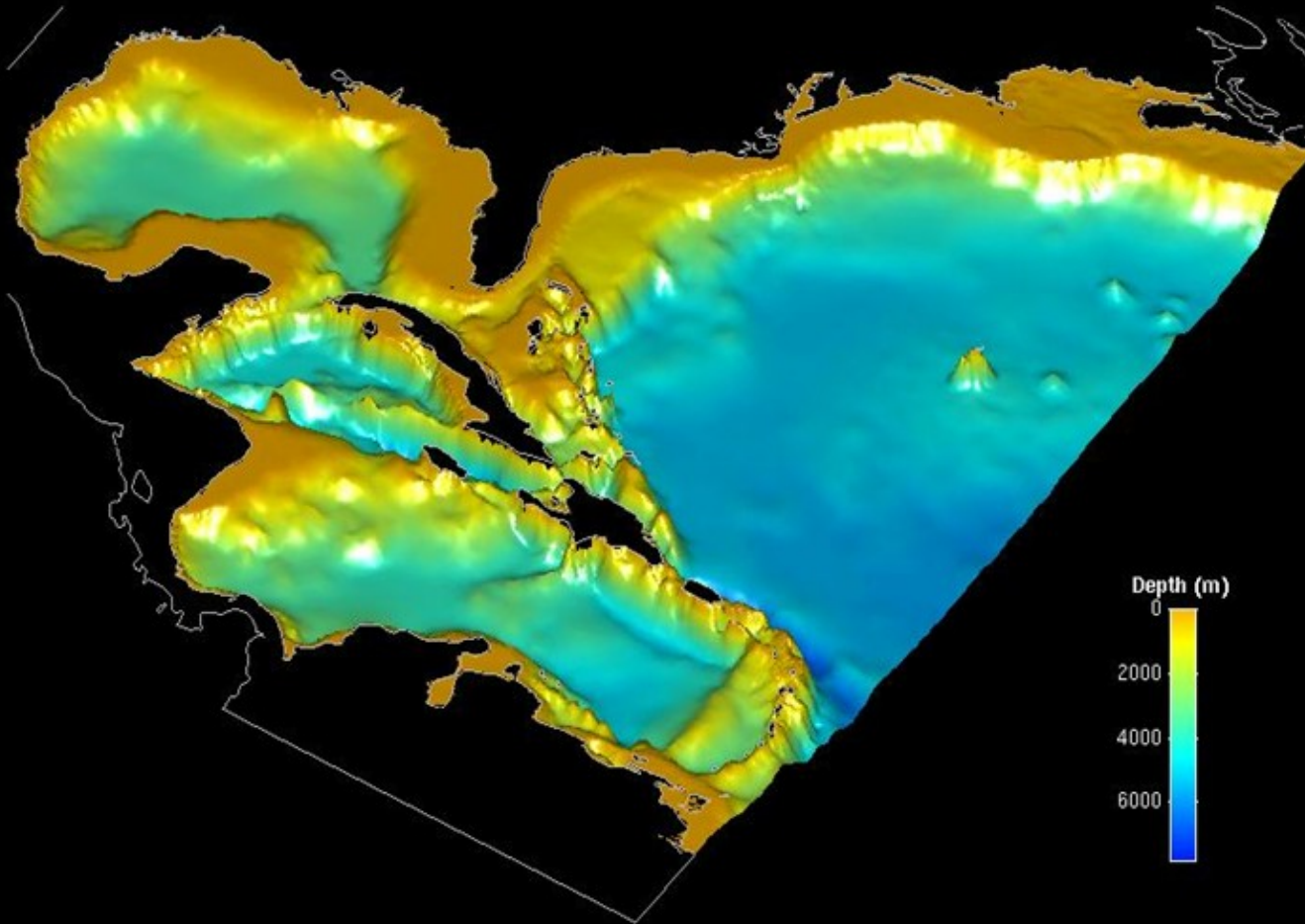


Methodology: Work Flow





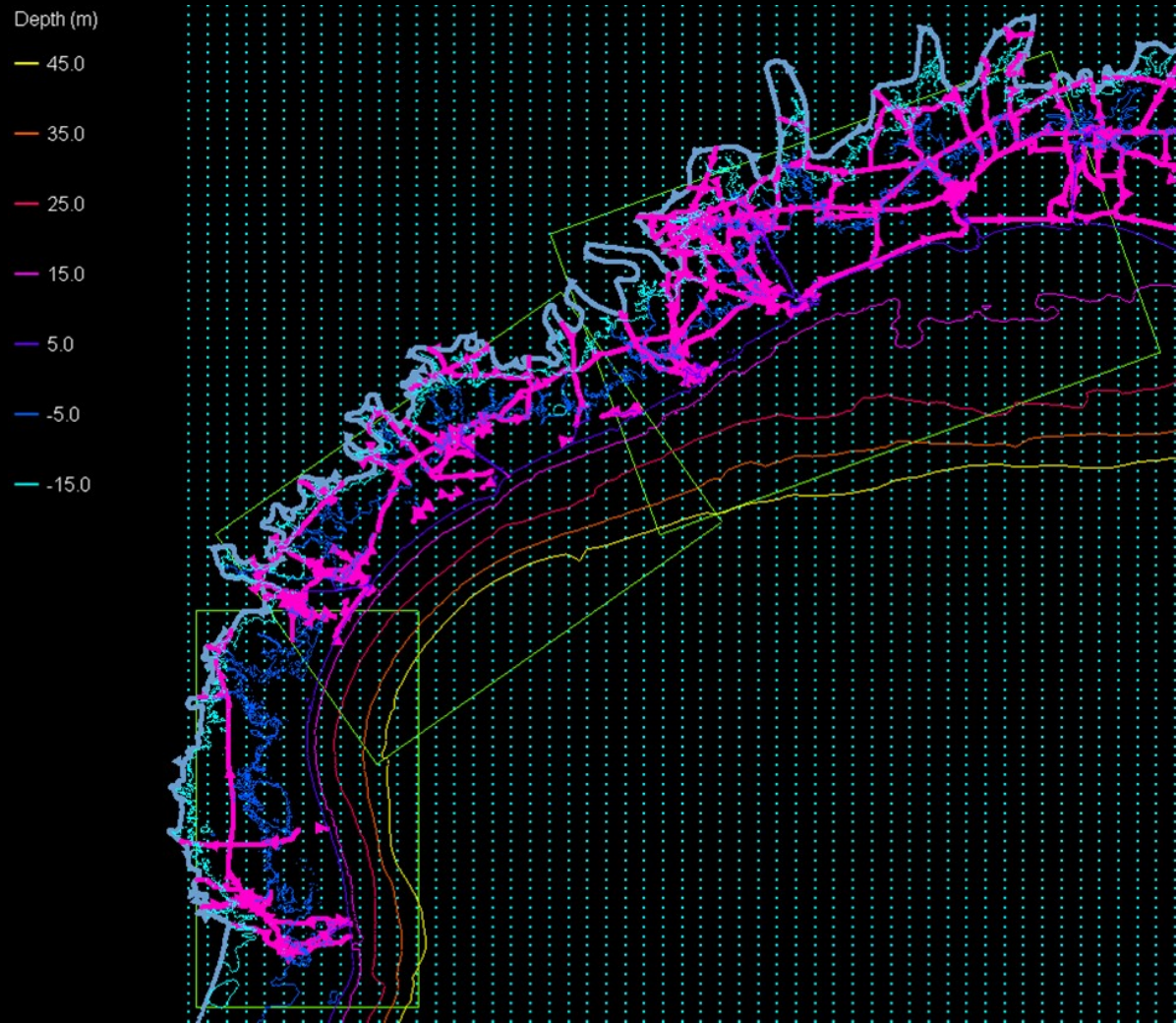
Methodology: ADCIRC Grid



- Finite Element
- 2 million nodes
- >90% in LA/TX coastal areas

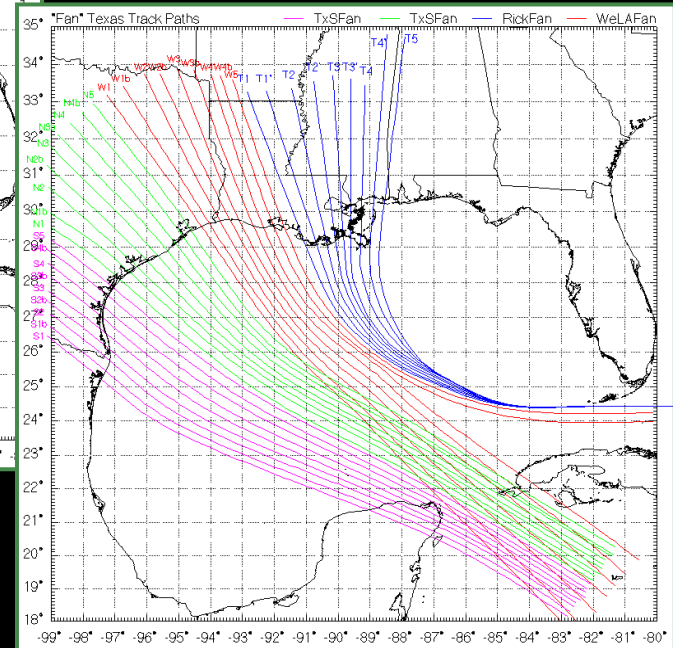
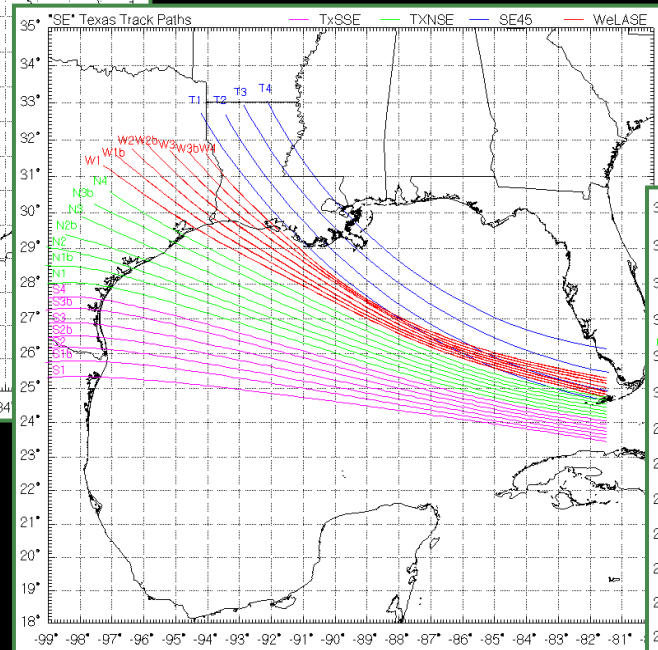
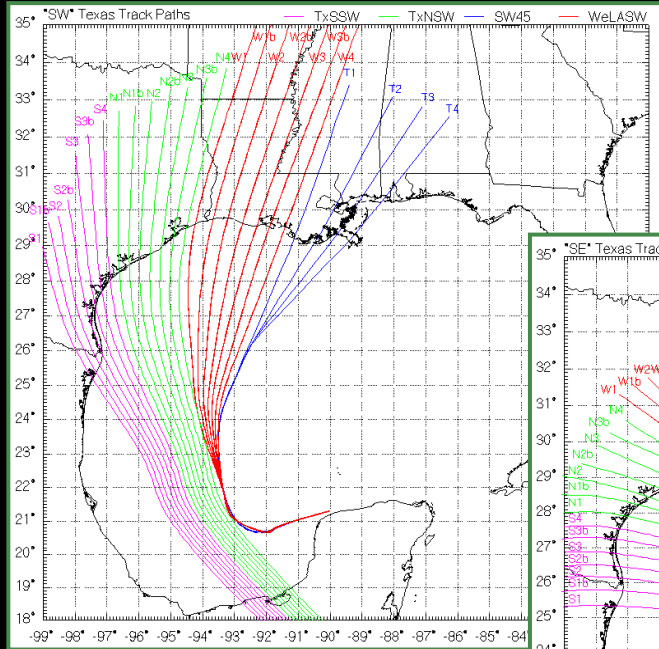


Methodology: WAM & STWAVE Grids



One Team: Communicating, Collaborating, Consensus

Methodology: JPM-OS Storm Tracks



One Team: Communicating, Collaborating, Consensus



Output: Surge Data



The following projects utilize the data generated by the Surge Modeling Team:

- Interagency Performance Evaluation Taskforce (IPET)
- Louisiana Coastal Protection and Restoration (LACPR)
- Greater New Orleans Hurricane and Storm Damage Risk Reduction System (GNOHSDRRS)
- Inner Harbor Navigation Canal (IHNC)
- Federal Emergency Management Agency (FEMA) – Map Modernization Program (LA & TX)
- Morganza to the Gulf
- ** All future feasibility studies involving hurricane risk reduction conducted by MVN **



Storm Surge Analysis: A Systematic Tool



Systems Based Approach to evaluating storm surge across the Gulf Coast:

- Consistent with Corps' *12 Actions for Change*, specifically "Plan...projects as parts of larger, integrated systems...and [evaluate] the local and regional implications of alternative concepts for achieving project goals. "
- Determining project specific effects of structural hurricane protection measures upon the immediate area under investigation
- Assessing cumulative impacts of hurricane protection systems across the southern coast of the United States



Storm Surge Analysis: A Systematic Tool



Systems Based Approach to evaluating storm surge across the Gulf Coast (cont'd):

- Employing consistent methodology in analyzing storm surge across the coast
- Planning and sequencing storm surge analysis work to avoid competing resources
 - Manpower
 - Computer
- Extensive Independent Technical Review (ITR) phased throughout process of analysis
- Interagency collaboration to determine coastal storm surge values



Key Takeaway Points



- Integrating multiple state of the art software packages ensures precision in developing a system model
- Analyzing single projects as part of a whole system is the basis for a holistic evaluation of cumulative impacts on the Gulf Coast
- Utilizing one methodology for conducting storm surge analysis for the Gulf Coast ensures consistency across the various hurricane protection projects
- Interagency collaboration led to consensus in storm surge values
- Sequencing, coordinating and scheduling multiple modeling efforts requires teamwork, communication and eliminates duplication of efforts



Contact Information



Virginia Brisley

504.862.2613

virginia.p.brisley@usace.army.mil